

SECTION 05 70 00
DECORATIVE METAL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Stainless steel composite panels
- B. Fire hose cabinets
- C. Stainless steel service gates and barriers
- D. Map, schedule, and advertising frames
- E. Windscreen assemblies
- F. PABX telephone enclosures
- G. Public telephone carrels
- H. Stainless steel handrails and railings
- I. Perforated ceiling panels

1.02 RELATED SECTIONS

- A. Welding of stainless steel is specified in Section 05 05 22 - Metal Welding.
- B. Metal handrails and railings related directly to service stairs are specified in Section 05 51 00 - Metal Stairs.
- C. Painted ferrous and galvanized handrails and railings are specified in Section 05 52 00 - Metal Railings.
- D. Manufactured stainless steel fire extinguisher cabinets are specified in Section 10 40 00 - Safety Specialties.

1.03 MEASUREMENT AND PAYMENT

- A. Measurement
 - 1. Decorative metalwork will be measured for payment by the lump-sum method, acceptably fabricated and installed.
 - 2. All items of materials, hardware, fasteners, accessories, incidentals, and their installation will be considered as included in the lump-sum unit measurement.
- B. Payment: Decorative metalwork will be paid for at the Contract lump-sum price as indicated in the Bid Schedule of the Bid Form.

1.04 REFERENCES**A. American National Standards Institute (ANSI):**

1. ANSI Z97.1 Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test

B. American Society for Testing and Materials (ASTM):

1. ASTM A240 Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
2. ASTM A269 Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
3. ASTM A312 Specification for Seamless and Welded Austenitic Stainless Steel Pipe
4. ASTM A480 Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
5. ASTM C1048 Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass
6. ASTM E84 Test Method for Surface Burning Characteristics of Building Materials
7. ASTM F593 Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
8. ASTM F594 Specification for Stainless Steel Nuts
9. ASTM F837 Specification for Stainless Steel Socket Head Cap Screws
10. ASTM F879 Specification for Stainless Steel Button and Flat Countersunk Head Cap Screws
11. ASTM F880 Specification for Stainless Steel Socket - Set Screws

C. National Association of Architectural Metal Manufacturers (NAAMM):

1. AMP 503 Finishes for Stainless Steel Pipe Railing Manual, Including Round Tube

D. Specialty Steel Industry of North America (SSINA):

1. "Designer Handbook" series including the following industry standards:

Design Guidelines for the Selection and Use of Stainless Steel, as follows:
Specifications for Stainless Steel
Finishes for Stainless Steel

Fabrication of Stainless Steel
Stainless Steel Fasteners

1.05 SUBMITTALS

- A. General: Refer to Section 01 33 00 - Submittal Procedures, and Section 01 33 23 - Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Shop Drawings: Submit detailed Shop Drawings of decorative metalwork, showing sizes, details of fabrication and construction, handrail brackets, locations of hardware, anchors, and accessories, and installation details.
- C. Product Data: Submit manufacturers' product data of manufactured items and for miscellaneous hardware items associated with decorative metalwork.
- D. Samples: Submit samples of stainless steel finishes for the different locations. Pipe and tube shall be submitted in 10-inch lengths; sheet shall be submitted in 8-inch by 10-inch size.
- E. Selected decorative metal components shall match the Engineer's control samples in quality of fabrication, joinery, welding, and finish.

1.06 QUALITY ASSURANCE

- A. Work Quality:
 - 1. Shop and field work shall be performed by mechanics, craftspersons, artisans, and workers skilled and experienced in the fabrication and installation of the decorative metalwork involved.
 - 2. Stainless steel work shall conform with the quality requirements of the herein referenced Specialty Steel Industry of North America, "Designer Handbook" series standards. Pipe and tube railings shall conform with NAAMM "Pipe Railing Manual, including Round Tube."
- B. Iron Contamination (Rust): Stainless steel with iron contamination will not be accepted. Dies for forming stainless-steel components shall be stainless steel or chrome-plated to prevent embedment of minute iron particles. All stainless-steel work shall be polished and cleaned after fabrication and installation to prevent rusting susceptibility.
- C. Welds of Stainless Steel: Exposed welds shall be ground smooth and polished to match the adjacent surrounding finish of the stainless steel.

PART 2 - PRODUCTS**2.01 MATERIALS**

- A. Stainless Steel Tube or Pipe: Provide stainless steel tube or pipe, where indicated, conforming to ASTM A269, Grade TP316, or ASTM A312, Grade TP316, of diameters and sizes indicated. Provide tube or pipe with a polished finish similar to NAAMM AMP 503 No. 4 finish. Tube or

pipe shall receive a final polishing using grit no coarser than 180 grit. Ends shall be closed with matching material, welded, and ground smooth.

1. Handrails: Provide terminal safety returns for all handrails. Handrail brackets shall be stainless steel, wrought or welded, manufactured for the purpose, for anchorage to indicated substrate. Handrail brackets shall comply with applicable code and loading requirements. Finish of brackets shall match handrail finish. Include all fittings and components, sleeves, hardware, backing plates, and accessories as required for complete and finished handrail installations.
 2. Railing Corners: Provide one-quarter sphere components for rounding of 90-degree, outside railing corners. Sphere components shall be welded into position, and the weldments shall be ground and dressed smooth so as to be invisible in the finished work.
- B. Stainless Steel Sheet and Plate: ASTM A240 and ASTM A480, Type 316, of thickness indicated, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish.
- C. Anchor Plates: Provide stainless steel anchor plates conforming to ASTM A240 and ASTM A480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish.
- D. Welding Rod/Electrodes: Refer to Section 05 05 22 - Metal Welding, for requirements. Provide stainless steel welding electrodes.
- E. Anchors, Fasteners, and Accessories: Provide all required anchors, fasteners, miscellaneous components, and accessories as required for complete and finished decorative metal installations. Bolts, studs, and nuts shall conform with ASTM F593, F594, F837, F879, and F880 as applicable, Type 316. Comply also with applicable requirements of SSINA's "Stainless Steel Fasteners." Anchors and fasteners shall be tamper-resistant where exposed.
1. Self-Tapping Screws, Washers and Shims: Oval head, counter-sunk phillips self-tapping screws, washers, and horseshoe shims shall consist of a 316 stainless steel alloy.
 2. Expansion Bolts: Where anchors are not included in the concrete or masonry construction, provide stainless steel expansion type anchors with matching stainless steel bolts or studs with nuts, of sizes as indicated or required to meet installation conditions. Provide stainless steel washers under all bolt heads and nuts. Expansion bolts require approval of the Engineer before they may be installed in post-tensioned slabs. Expansion bolts will not be permitted for use on concrete curbs or along the edge of concrete or a concrete joint.
- F. Grout: Refer to Section 03 61 11 - Non-Shrink Grout, for requirements.
- G. Glass: Refer to Section 08 80 00 - Glazing, for glass and glazing requirements, including quality assurance provisions for heat-strengthened and tempered glass.

2.02 FABRICATION

- A. Decorative metalwork shall be fabricated by firms or shops experienced and skilled in the custom fabrication of architectural decorative metalwork. Form and fabricate the work as indicated and as required to meet installation conditions.

- B. Bends in tubes or pipes shall be precision-formed to a smooth continuous radius by skilled workers, true to detail. Butt joints shall have tight-fitting internal pipe sleeve or dowel.
- C. Butt joints in stainless steel pipe or tube railings shall not be welded. Instead, railing joints shall have internal, tight-fitting stainless steel sleeve, secured with tamper-resistant, counter-sunk stainless steel fasteners, located at the railing bottom. Butt joints in railings shall be precision-manufactured to provide tight hairline joints, slightly eased at edges to eliminate burrs and sharp edges. Provide for expansion and contraction at joints when railings exceed runs of 40 feet in length.
- D. Stainless steel welded connections shall be made in accordance with applicable requirements of Section 05 05 22 - Metal Welding. Welding shall be performed in the shop unless otherwise indicated. Welded joints shall be ground and dressed smooth to match adjacent surfaces and so that the shape and profile of the item welded is maintained and so that the weld seam is invisible in the finished work. Welds shall be ground and polished to match NAAMM AMP 503 No. 4 finish.
- E. Decorative metalwork shall be prefabricated and preassembled in the factory or shop as far as practicable.
- F. All stainless steelwork, after receiving NAAMM AMP 503 No. 4 polished finish, shall receive a final polishing using non-ferrous grit no coarser than 180.

2.03 STAINLESS STEEL COMPOSITE PANELS

- A. Materials: Provide stainless steel panels and cladding, as indicated, constructed of composite panels, consisting of stainless steel sheet and backing (balancing) sheet laminated to an inner core. Comply with the following requirements:
 - 1. Stainless Steel Sheet: ASTM A240 and ASTM A480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish. Construct all face joints flush, continuously welded, ground and polished smooth. Metal gage shall be as indicated. Where metal gage is not indicated, provide minimum thickness of 18 gage.
 - 2. Core: Cement-bonded particle board inner-core panel of thickness indicated. Inner-core panel shall meet the following requirements:

a.	Density	76 pounds per cubic foot
b.	Modulus of Rupture	1300 to 1900 psi
c.	Modulus of Elasticity	725,000 psi
d.	Compressive Strength	2180 psi
e.	Moisture Content	9 percent, plus or minus 3 percent
f.	Surface Burning	5 flame spread
	Characteristics when tested in accordance with ASTM E84	0 smoke developed 0 fuel contributed
g.	Swelling resulting from water immersion	0.86 percent thickness 0.12 percent length

for 24 hours
(18mm thick board) 0.07 percent width

3. Backing (Balancing) Sheet: Backing sheet shall be stainless steel of same type, metal gage, and finish of the exposed face sheet. All panels shall be fabricated with backing sheet. Where backing sheet will be concealed in the finished work, the finish may be a nonpolished mill finish.
 4. Adhesive: Type I waterproof glue, manufactured for, and capable of, veneering stainless steel and galvanized steel sheet to core material.
- B. Assembly: Laminate stainless steel sheets to the inner core material with adhesive applied over full contact area in accordance with adhesive manufacturer's instructions. Apply under pressure. Close all contact edges tight at corner joints, continuously weld, grind, and dress smooth. Refinish and polish all welds to match adjacent No. 4 finish.
- C. Cutting of panel edge will not be acceptable.

2.04 FIRE HOSE CABINETS

- A. Cabinet Body and Door: Provide cabinet body and door, constructed of a composite panel consisting of stainless steel sheets laminated to an inner core, as follows:
1. Stainless Steel Sheets: ASTM A240 and ASTM A480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish. Construct all face joints flush, continuously welded, ground and polished smooth. Metal gage as indicated.
 2. Core: Cement-bonded particle board inner-core panel as specified in Article 2.03 herein for stainless steel composite panels, of thickness indicated.
 3. Assembly: Laminate stainless steel sheets to both sides of the inner-core panel with adhesive applied over full contact area in accordance with adhesive manufacturer's instructions. Close all contact edges tight at corner joints, provide continuous weld, grind, and dress smooth.
 4. Angles: Stainless steel, ASTM A240 and ASTM A480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish where exposed.
 5. Gasket: Adhesive applied, weatherproof closed-cell, expanded neoprene gasket, 1/4 inch thick, on cabinet enclosure for sealing door perimeter.
- B. Hinges: Stainless steel full length, heavy-duty piano-type, meeting the requirements of ASTM A240 and A480, Type 316, minimum 14 gage.
- C. Latch: Stainless steel and brass, flush type, with spring-loaded catch activated by a pull device. Latch shall be replaceable, vandal-resistant screw mounted.

D. Cabinet Identification:

1. Cabinets shall be labeled with the words "FIRE EXTINGUISHER" and "FIRE HOSE" in one inch high letters, Univers 65 style.
2. Lettering shall be engraved in a separate stainless steel plate that is mounted on the cabinet door. The Letters shall be filled with exterior sign enamel, black as selected by the Engineer.
3. Stainless-steel plate shall have all edges chamfered and shall be secured with tamper-resistant stainless steel fasteners or permanent adhesive.

2.05 SERVICE GATES, GUARDRAILS, AND BARRIERS

- A. Fabricate top and bottom rails from stainless steel tube or pipe, as indicated, conforming to ASTM A269, Grade TP316, or ASTM A312, Grade TP316. Fabricate pickets or balusters from stainless steel square tube or bars, as indicated, Type 316.
- B. Neatly cope intersections, fully weld, grind, and polish smooth. Heat curves and blend smoothly without visible distortion of cross section. Provide rounded corners at outside railing corners as herein specified under "Materials."
- C. Gate hinge shall be a floor-mounted, center-hung, double-acting, non-handed closer in a 4-1/16 inch deep steel case with minimum 0.042 inch thick stainless steel cover plate, ASTM A240 and ASTM 480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 finish. Top pivot shall have an oilite bearing for recovering stainless steel pin. Complete assembly shall be handicapped accessible. Comply with Engineer's control sample.
- D. Provide positive stop and latch where indicated. Comply with Engineer's control sample.

2.06 MAP, SCHEDULE, AND ADVERTISING FRAMES

- A. Frame Units: Fabricate from stainless steel pipe conforming to ASTM A312, Grade TP316. Form 90 degree elbows by mitering and continuously welding a stainless steel one-quarter sphere to a cut-out area of the pipe as herein specified under "Materials." Neatly cope intersections, fully weld, and grind smooth and flush.
- B. Glazing: Two panes of tinted tempered and laminated glass, ASTM C1048, Kind FT, Type I, Class 1, Quality q3, and ANSI Z97.1. Lamination interlayer shall be a minimum of 0.30 inch thick polyvinyl butyral. Size as indicated. Glass shall be set in stainless steel stops with glazing tape consisting of synthetic rubber sheet or strip material reinforced and stabilized with fabric mesh in center and treated with a bonding agent on both contact surfaces.
- C. Hinge: Stainless steel full length, heavy-duty piano-type, meeting the requirements of ASTM A240 and ASTM A480, Type 316, minimum 14 gage.
- D. Lock: Cylinder type, CAT 74, compatible with BART's keying system. Comply with the Engineer's control sample.

2.07 WINDSCREEN ASSEMBLIES

- A. Interface and Coordination: Coordinate construction with precast concrete bench details. Refer to Section 03 40 00 - Precast Concrete, for requirements.
- B. Fabrication: Fabricate from stainless steel pipe conforming to ASTM A312, Grade TP316. Form 90 degree elbows by mitering and continuously welding a stainless steel one-quarter sphere to a cut-out area of the pipe as herein specified under "Materials." Neatly cope intersections, fully weld, and grind smooth and flush, and polish to match adjacent finish surfaces.
- C. Glazing: Provide two panes of tinted tempered and laminated glass, ASTM C1048, Kind FT, Type I, Class 1, Quality q3, and ANSI Z97.1. Lamination interlayer shall be a minimum of 0.30 inch thick polyvinyl butyral. Provide glass of size and thickness indicated. Dry set glass with structural glazing gasket consisting of a single piece neoprene unit that seals with an interlocking neoprene strip after unit grips the glass and frame nib.
- D. Precast Concrete Bench Components: Refer to Section 03 40 00 - Precast Concrete, for requirements.
- E. Stainless Steel Composite Panels: Comply with requirements of Article 2.03 herein.

2.08 PABX PHONE ENCLOSURE

- A. Cabinet Body: Stainless steel, ASTM A240 and ASTM A480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish. Construct all face joints flush, continuously welded, ground and polished smooth. For composite panels, refer to Article 2.03 herein for requirements.
- B. Angles: Stainless steel, ASTM A240 and ASTM 480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish where exposed.
- C. Hinges: Stainless steel, full-length, heavy-duty piano-type, meeting requirements of ASTM A240 and ASTM A480, Type 316, minimum 14 gage.
- D. Lock: Cylinder type, CAT 74, compatible with BART's keying system. Comply with the Engineer's control sample.
- E. Gasket: Apply a weatherproof closed-cell expanded neoprene gasket with adhesive to cabinet enclosure to seal door perimeter.
- F. Assembly: Close all contact edges tight at corner joints, continuously weld, grind, and dress smooth.
- G. Installation: Pre-drill holes for anchorage.

2.09 PUBLIC TELEPHONE CARREL

- A. Fabrication: Fabricate from stainless steel tube or pipe as indicated. Form 90-degree elbows by continuously welding a stainless steel one-quarter sphere to a cut-out area of the pipe as herein specified under "Materials." Neatly cope intersections, fully weld, and grind smooth and flush.

- B. Acoustical Panel: Perforated stainless steel, 16 gage, ASTM A240 and ASTM A480, Type 316, with ASTM A480 or NAAMM AMP 503 No. 4 polished finish, with sound absorptive black fiberglass ductliner-type backing.
 - 1. Sound-Absorptive Insulation: Panels shall be backed up with ductliner-type insulation board fitted snugly and continuously within the panel's turned-in or turned-up edges. Insulation board shall conform with the following requirements:
 - a. Insulation board shall be manufactured from resin-bonded fibrous glass specifically for duct systems with integral vapor barrier. Nominal thickness: one inch. Color: black.
 - b. Insulation board shall have a flame-spread rating of 25 or less and a smoke-developed contribution of 5 or less when tested in accordance with ASTM E84, and shall be able to withstand 2 inches of static pressure.
- C. Wiring and Conduits: All wiring and conduits shall be concealed. Exposed wiring and conduits will not be permitted.

2.10 HANDRAILS AND RAILINGS

- A. Handrails and Railings: Stainless steel tube or pipe as herein specified under "Materials" and "Fabrication".
- B. Metal Components and Accessories: Stainless steel, Type 316, of configurations and sizes indicated.
- C. Handrail Brackets: Provide manufactured 300 Series stainless steel handrail brackets with proper anchorage hardware for adjoining construction.

2.11 PERFORATED CEILING PANELS

- A. Stainless Steel Perforated Sheet: No. 16 gage, Type 316 stainless steel with IPA No. 108 pattern perforated sheet, consisting of 5/64-inch diameter holes on 1/8-inch centers, in staggered configuration creating 36 percent open area. Provide and fabricate without border area. Provide with No. 4 polished finish.
- B. Fabrication: Fabricate ceiling panels accurately to the sizes and configurations indicated. Provide turned up and returned edges for all panels as indicated. Panels shall be fabricated to be removable. Provide finished holes for fasteners to ceiling framing system.
- C. Insulation: Ceiling panels shall be backed up with duct liner-type insulation board fitted snugly and continuously within the panel's turned up edges. Insulation board shall conform with the following requirements:
 - 1. Insulation board shall be manufactured from resin-bonded fibrous glass specifically for duct systems with integral vapor barrier. Nominal thickness: one inch. Color: black.

2. Insulation board shall have a flame-spread rating of 25 or less and a smoke-developed contribution of 5 or less when tested in accordance with ASTM E84, and shall be able to withstand 2 inches of static pressure.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install decorative metalwork as indicated and in accordance with the approved Shop Drawings, using workers skilled and experienced in the installation of the type of work involved.
- B. Install metal handrails and railings with installation accessories furnished by the railing fabricator as required for complete and finished railing installations.
- C. Install decorative metalwork true and horizontal, perpendicular, or at the required angle, as the case may be, level and square, with angles and edges parallel with related lines of the building or structure.
- D. Field welding, where required, shall conform with requirements specified herein for shop welding under "Fabrication." All welds shall be ground and polished smooth to match adjacent finish surfaces.

3.02 CLEANING OF STAINLESS STEEL

- A. All stainless steelwork shall be cleaned of all dirt, dust, oil and grease, fingerprints, atmospheric and aqueous corrosion, and iron contamination, rinsed with clear water, and then polished before the Engineer's final inspection that establishes Substantial Completion of the Contract.
- B. The cleaning method shall be the mildest treatment necessary for the problem. For example: a solution of soap, detergent, or ammonia and water, applied with a sponge and rinsed with clear water. If this method is inadequate, then the next stronger method shall be tried, progressively, until satisfactory results are obtained.
- C. Heavy dirt, grease, and oil shall be removed with organic solvents or degreasing agents and then thoroughly rinsed with clear water.
- D. Corrosion shall be removed by scouring lightly with an abrasive cleaner, rubbing in the direction of the finish grain of the metal. In cases of extreme discoloration, use scouring sponges or steel wool, made only from stainless steel, and then rinsed thoroughly with clean water.
- E. Iron contamination shall be removed by passivation, a chemical cleaning method involving the use of nitric acid. This cleaning method shall be performed in the shop only, unless no other treatment at the site is successful. Passivation treatment at the site shall be performed under the continuous supervision of the stainless steel fabricator, employing all required safety precautions and protection of adjacent surfaces.
- F. Weldments may require additional fine grinding to remove corrosion or iron contamination if no other cleaning method is successful.

- G. All cleaned and rinsed stainless steelwork shall be dried with clean towels and then polished by buffing. If a dull or satin finish is indicated, then buff only enough to remove any remaining residue.

END OF SECTION 05 70 00